

SIR JAMES PAGET, BART., F.R.S.

THE death of Sir James Paget removes from our midst one of the ornaments of the medical profession. The loss is not an acute one since, though living up till some ten days ago, Sir James has for the last decade taken little active part in professional matters, but still, although the sphere of his activities has been during this period restricted by infirmity, one had evidence from time to time that he was there, using to the best of his strength that cultured mind, which never lost its vigour, for the benefit of those branches of knowledge which he loved so well.

This week's medical papers are so full of the professional attainments of the subject of this notice, and so rich in minute biographical detail, that there remains on these subjects little to be said. Sir James Paget was chiefly known to the world as a great surgeon, who, in addition to his actual professional abilities, exercised a profound charm over his patients. He was for the years he worked actively at St. Bartholomew's the student's model; not only what he did in the wards, but how he did it, served as a type to be imitated. His lectures and demonstrations were eagerly attended, and no note of discordance was there. The medical student, now of academic habits, was apt, in the early teaching days of Paget, to be rowdy, but there was never any disorder at his lectures, his fascinating diction rendering even the details of the most unæsthetic subjects sufficiently attractive to ensure the attention of his class.

Although Sir James Paget's practice as a surgeon, when he was at the height of his vigour, has perhaps never been surpassed, it was to the science of surgery rather than to its art, to its theory rather than to its practice, that he mainly contributed. He was no operating surgeon in the sense of Billroth. His surgery always contained in it an element of philosophy, a projection, so to speak, of his own philosophical spirit. He was a teacher, and enunciator of principles rather than mere facts.

In these days of what may be termed mathematical biography, one is apt to sum up a man's works, his contributions to knowledge, and regard the sum of them as an accurate measure, if not an actual expression, of his intellectual influence. This is not a fair test of the actual work of Paget. His original work on the catalogue of the Hunterian Collection at the College of Surgeons, and on that of the museum at St. Bartholomew's, his discovery of the trichina spiralis, his description of Paget's disease of the nipple and osteitis deformans, are perhaps the chief examples of his labours sufficiently sharp to wedge themselves through the crude and erratic surface of popular professional recognition. This, however, is no real measure of the man; he learnt from everything and taught from everything. He had the power of impressing the most varied subject-matter with his own philosophical individuality; the subject-matter in 1846 being the flora of Yarmouth; in 1896, or thereabouts, the medical student; his routine duties as warden at St. Bartholomew's affording to him material for a most valuable essay as to the ultimate fate and chances of success of the medical student.

In Paget's intellectual prime principles of exact science were beginning to be applied to medicine and surgery, such men *inter alia* as Pasteur, Liebig, Helmholtz, Brücke, &c., were busy examining with instruments of precision the fundamental phenomena and manifestations of life; not the least merit of Paget was that he kept well abreast of these stirring times, and gleaned from the purely scientific work of the great masters, facts and principles which he applied to surgery and surgical pathology. In these days of triennial medical congresses one can form but a very poor idea of what it meant in Paget's early days to be well up in con-

temporary science. His frequent advice to students to learn German seems now difficult to understand; it would be interesting to inquire how many men there are now who wish they had taken it.

Paget must be regarded, then, as an original teacher more than an original worker or writer; his ideas, perhaps somewhat metamorphosed in accordance with more exact technique, by his pupils, are springing up to-day on all sides, and will continue to do so. Like all truly great, he was truly benevolent, and many suggestions and ideas emanating from his mind have seen daylight under the names of his pupils.

F. W. TUNNICLIFFE.

NOTES.

THE Chemical Society's Victor Meyer Memorial Lecture will be delivered by Prof. T. E. Thorpe, President of the Society, on the evening of Thursday, February 8, at 8.30.

WE learn from *Science* that Prof. William Harkness, astronomical director of the U.S. Naval Observatory, retired as Rear-Admiral on December 17, on reaching the age of sixty years. Prof. S. J. Brown has been appointed to succeed him at the Observatory.

A SEVERE earthquake occurred on New Year's day in the province of Tiflis. The greatest amount of damage was done in the district of Achalkalak, in which six villages were completely destroyed and seven others had many houses ruined. Up to the present time, eight hundred dead bodies have been recovered.

WE regret to have to record the death, on January 1, after a very short illness, at his residence in Norwood, of Mr. W. T. Suffolk, the Treasurer of the Royal Microscopical Society, in his sixty-ninth year. Though but little known to the general public, and carried out in a very unobtrusive way, his services to microscopical science were great.

THE general manager of the South-Eastern and Chatham Railway, Mr. Alfred Willis, has made arrangements with the Wireless Telegraph and Signal Company for the Marconi system to be used in the course of a few weeks on the company's Royal Mail steamers between Dover and Calais, and also on their Royal Mail steamers between Folkestone and Boulogne. By this arrangement the vessels when in mid-Channel, or half-an-hour from either the French or English shores, will have telegraphic communication with either side.

THE Paris correspondent of the *Chemist and Druggist* remarks:—Prof. Riche, who was recently succeeded at the Paris School of Pharmacy by Prof. Moissan, was born at Gray (Hautes Saône) in 1829, and studied at the Faculty of Sciences and the Polytechnic School. He was appointed assistant professor at the School of Pharmacy in 1859, and professor of inorganic chemistry in 1873. His principal researches are on tungsten and its compounds. He has done some valuable work at the French Mint in compounding alloys, and is an active and useful member of the Paris Council of Hygiene. His successor, M. Moissan, declares that it was in listening to his chemical lecture that he felt his first enthusiasm for the subject and resolved to become a chemist.

SINCE last week's issue we have received the *Connaissance des Temps* for 1901, the opening year of the new century. We then quoted a statement in the *Times* that the Paris Observatory "will henceforth in all its publications reckon the day from midnight to midnight." In spite of a suggestion to the contrary made some time ago, both the *Nautical Almanac* and the *Connaissance des Temps* have made no change, and the day is reckoned from noon to noon.

THE *Board of Trade Journal* states that nettle fibre has of late come greatly into favour in the manufacture of fine yarns and tissues. In Germany there are factories which use these fibres both in spinning and also for ulterior purposes. Nettle fibre produces one of the finest tissues obtainable from any known kind of vegetable fibre. In view of the importance which this seems likely to attain in connection with the weaving industries, it is intended to introduce the cultivation of nettles, if possible, into the Cameroons. The idea is to prepare the products of this experimental culture at the place where they are obtained, and test them in German factories. Should favourable results follow from these experiments, it is intended to organise nettle-growing enterprises on an extensive scale.

A NEW commercial intelligence branch of the Board of Trade has been established with a view to meet the constantly increasing demand for prompt and accurate information on commercial matters, so far as it can be met by Government action. In deciding to establish this new branch, the Board of Trade have been largely influenced by the recommendations contained in the report of a departmental committee appointed to consider and advise as to the best means of collecting and of disseminating among those interested prompt and accurate information upon commercial subjects, and as to the collection of samples, especially of goods of foreign manufacture competing with British productions, and the exhibition of such samples to manufacturers and traders in this country. The principal officer is Mr. T. Worthington, who recently acted as Special Commissioner to the Board in an inquiry into the condition and prospects of British trade in certain South American countries. The *Board of Trade Journal* will be the chief medium through which intelligence collected by the Branch and intended for general information will be conveyed to the public. The journal, which has up to the present been published monthly, is now issued weekly.

THE science of aerostatics has just lost one of its pioneers by the death of Mr. H. T. Coxwell, at the age of eighty-one. Mr. Coxwell's balloon ascents with Mr. James Glaisher, F.R.S., for the investigation of the meteorological conditions of the atmosphere at high altitudes, have long been prominent in scientific history. The circumstances which led him to take part in the work are described in an obituary notice in the *Times*. It appears that in 1862, hearing that a committee of the British Association at Wolverhampton had been making some unsatisfactory experiments with a Cremona balloon, in order to take meteorological observations in the upper regions, he set about the construction of a special balloon for this purpose, finally producing one that stood 80 feet from the ground, had a diameter of 55 feet, and was capable of containing, when fully inflated, 93,000 cubic feet of gas. Mr. James Glaisher, F.R.S., who had not previously made an ascent, was to go up with Mr. Coxwell and take charge of the observations, while Mr. Coxwell himself was to attend to the balloon. The first of the long series of ascents thus carried out by them under the auspices of the British Association took place at Wolverhampton on July 17, 1862, and on that occasion they travelled sixty miles in two hours, and attained a height of four miles. It was on September 5, in the same year, that the pair made the record journey of rising to a height of no less than seven miles above the surface of the earth; and the story of this exciting exploit shows that the intrepid investigators had a very narrow escape indeed of their lives. The result of the many ascents by Mr. Coxwell and Mr. Glaisher was some important contributions to the science of meteorology. Moreover, they proved more clearly than had ever been done before, that ballooning was not merely a pleasant pastime, but might be rendered of great practical utility. From the same point of view Mr. Coxwell was most

persistent in urging the advantages of employing balloons in times of war.

THE advantages of cremation as a means of disposing of the dead are too well known to need to be stated here. Neglecting sentimental considerations, the problem is, as Sir Henry Thompson puts it:—"Given a dead body: to resolve it into carbonic acid, water, and ammonia and the mineral elements rapidly, safely, and not unpleasantly." The present mode of burial is neither a satisfactory nor sanitary means of accomplishing this; and some of its dangers were pointed out by Dr. R. Farquharson in an address recently delivered at Aberdeen, and reported at length in the *Court Circular* of December 23, 1899. The lecture will be of service in enlightening people upon the subject of cremation, and directing their attention to the terrible condition of many old burial grounds.

IN the course of an interesting paper on lightning and its effect on trees, Mr. F. J. Brodie remarks in the *Journal* of the Royal Agricultural Society that in America much damage to live stock by lightning is believed to have arisen from the increasing adoption of wire fences. The director of the Iowa Weather and Crop Service, in his report on the thunderstorms of 1898, says: "Unquestionably wire fences, as now constructed, serve as death-traps to live stock, causing a vast amount of loss every year. And it is also quite evident that a considerable percentage of danger may be avoided by the use of ground wires at frequent intervals in the construction of wire fences." The point appears to be a practical one, deserving the notice not only of American but of English farmers, the means of protection from a real source of danger being after all very simple.

THE Meteorological Reporter to the Government of India has published a statement of the meteorology and rainfall of India during the past six months, and a forecast of the cold weather rains in Northern and Central India for the three months ending February 1900. The forecast issued in June last, from the conditions antecedent to the south-west monsoon, anticipated a rainfall slightly above the normal. This prediction was unfortunately not verified, as an area comprising nearly two-thirds of India is suffering from the most severe drought of the century. It is to be regretted that the meteorological conditions of October and November of last year strongly indicate the probability that the general character of the winter rains in the Persian area and North-Western India will be similar to that of the past four cold winters, and that the amount of the precipitation will probably be in general defect. The chief chance of the occurrence of more favourable rain than is anticipated lies in the early termination of the unknown causes which have produced abnormal conditions in the Persian and Upper India areas.

THE twenty-first yearly report of the Deutsche Seewarte, for 1898, has just been issued. The department of maritime meteorology continues to show great activity; the number of complete logs received from the mercantile marine alone amounted to 470, exclusive of 258 abstract-registers containing less complete observations. The great majority of the voyages were in the North Atlantic, but other oceans were fairly represented. In order to obtain as many observers as possible, agencies are established in many ports outside Germany, including the Consulates at Glasgow, London, Liverpool and Cardiff. The results of the observations are published in various ways useful to sailors, and have been frequently referred to in our columns. The system of weather telegraphy, and the possible acceleration and improvement of telegraphic weather reports receive considerable attention; storm warnings were issued to the various ports on 74 days, but the amount of success is not stated. In March last a conference was held

under the presidency of Dr. Neumayer, on the subject of the rating and improvement of chronometers; those of German manufacture were recommended for use, as far as practicable.

THE Rev. John M. Bacon, on the occasion of a night balloon ascent, underwent an enforced detention in the upper regions of the atmosphere exceeding in duration that of any other English balloon voyage on record, and he made use of the opportunity to study the varying currents blowing at different altitudes. In the January number of *The National Review* he gives the results of these observations in an article, entitled "The War of Winds," which, together with the facts he has collected, forms an interesting commentary on weather forecasts.

DR. FREDERICK A. COOK's description of the Belgian Antarctic expedition, of which he was a member, contributed to the January number of the *Century Magazine*, is accompanied by several exceptionally fine half-tone colour plates representing some of the Antarctic views seen during the journey of the *Belgica*. How promising the Antarctic is as a field of exploration may be judged from the following summary of the geographical results of the expedition:—"The work of the first two weeks when assembled proved the discovery of a highway perfectly free for navigation during the summer months from Bransfield Strait, two hundred miles south-westerly, through an unknown land to the Pacific. This highway has received the name of our ship, Belgica Strait. To the east of Belgica Strait we discovered a high, continuous country, which connects with the land charted as Graham Land. This has been christened Danco Land, in honour of our companion, Lieutenant Danco, who died on the ship during the long drift in the pack-ice which followed. The land to the west of the strait is cut up into islands by several channels, and was named Palmer Archipelago, in honour of Captain Nathaniel Palmer, the American sealer, who first of all men saw the outer fringe of this land. Scattered about in the waters of Belgica Strait are about one hundred islands and some groups of islands. About fifty of these are of considerable size. The islands, the capes, the bays, the headlands, and the mountains will mostly receive the names of Belgian friends of the expedition; but prominent outside workers have not been forgotten, as is evidenced by Nansen and Andrée Islands, and Neumeyer Channel."

MR. JOSEPH JACOBS, in an article, entitled "The Paths of Glory," in the current number of the *Fortnightly Review*, subjects the latest issue of "Who's Who" to a rough analysis, with the view of giving some idea of the kind of career which confers distinction on Englishmen. It seems that one Englishman out of every fifteen hundred throughout the British Empire attains popularity enough to secure a place in the biographical dictionary referred to. Among the results at which Mr. Jacobs has arrived, it may be noticed that "the comparative importance of politics as a means of figuring prominently in the world's thought" has changed but little during the thirty years since the publication of Mr. Galton's "Hereditary Genius." A comparison of the conclusions in this book with the contents of "Who's Who" leads to the remark that "scientific men must have increased more than fourfold in the interval (the last thirty years), yet their proportional parallax has declined from 73 to 42. Specialisation, doubtless, advances science and secures a man's position, but it rarely brings him prominently before the public." The argument as to the decline of the "proportional parallax" of men of science is, of course, unsound; for if "Who's Who" had been edited by some one familiar with the work of scientific men instead of a literary man, many minor writers would have been omitted from it and the names of more investigators well-known in the scientific world would have been included. The data from which Mr. Jacobs determines his "proportional parallax" are thus not comparable.

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FOR several years Prof. W. O. Atwater has been engaged in investigations to determine whether the energy given off from the body of a man in the form of heat, or of heat and external muscular work, is equal to the potential energy or heat of combustion of the material actually burned in the body; in other words, whether the law of the conservation of energy holds good for the living organism. The latest number of the *Physical Review* (vol. ix., No. 4) contains a concluding account, by Prof. Atwater and Mr. E. B. Rosa, of experiments made with the view of testing this point. A slight difference was found between the estimated income and measured outgo of energy in the experiments, and the authors conclude: "In view of defects and sources of error in methods and apparatus, we would, perhaps, be unwarranted in assuming that the experiments thus far made completely demonstrate the applicability of the law of the conservation of energy in the human organism. They do, however, seem to us to be reasonably near to such demonstration." The mechanical efficiency of a man was determined by a comparison of the energy used when at rest and when performing muscular work. The work done, divided by the total energy yielded by the body, gave 7 per cent. as the mechanical efficiency. As, however, a large amount of the energy received was used up in the body, only the excess of energy absorbed in the work experiment over that required when the subject was at rest should be charged against the work done. When this was taken into account the mechanical efficiency of man came out at 21 per cent., which equals or exceeds that of the best compound condensing engines with the highest efficiency boilers.

TWO more parts of the zoology of the Norwegian North Atlantic Expedition have recently been issued; one (No. xxv.), by Hans Kier, dealing with the Thalamophora (Foraminifera), and the other (No. xxvi.), from the pen of Kristine Bonnevie, treating of the Hydroid Zoophytes. As usual, an English translation is printed in parallel columns with the Norwegian text; and although this, in the main, is well done, it would have been all the better for revision by an English proof-reader. The Foraminifera indicate that the portion of the Atlantic basin surveyed by the expedition is capable of division into three areas. Firstly, the southern grey clay, including the fjords and banks along the Norwegian coast, about as far as long. 19° E., as well as the similar clay area near Iceland and Jan Mayen. Secondly, the northern grey clay, comprising the fjords and banks along the aforesaid coast to the eastward of long. 19° E., and likewise the vicinity of Bear Island and Spitzbergen. Thirdly, the brown clay, subdivided into the *Biloculina* and the transition clay. So greatly does the brown clay differ in its fauna from the grey, that of the species of Foraminifera found on the former, only about two-thirds are common to the latter. It is also noticed that, with the exception of the eastern portion, the grey clay on the Norwegian coast is remarkably rich in these organisms, half of those met with during the expedition being taken there. From the great depths towards the coast the *Globigerinae* gradually diminish in number, until they almost disappear near the coast and in the fjords.

Modern Medicine states that Dr. A. Campbell White has been experimenting with liquid air on the tissues of the body. The results obtained encourage the belief that it will come into use as a local anæsthetic, and possibly for other medical and surgical purposes. The difference in temperature between liquid air and the human body is so great that it affords a unique means of producing a sudden and extreme shock to a localised part of the body, without localised destruction of tissue, or without affecting the general system.

MR. G. A. HEMSALECH, who, in conjunction with Prof. Schuster, recently published an account of their joint researches

on the constitution of the electric spark (*Proc. Roy. Soc.*, vol. xiv. p. 331), has continued the research in the laboratory of M. Lippmann, in Paris. In the *Journal de Physique* (Series 3, vol. viii. pp. 652-660) he gives a detailed account of the action of the jar spark, with and without self-induction in the secondary circuit, on the metals bismuth, copper, cadmium, zinc, lead, iron, cobalt, silver, mercury and also on the gases hydrogen and oxygen. In every case the effect of self-induction in the secondary is to lower the temperature of the spark, the resulting spectrum being intermediate between that of the arc and the ordinary condensed spark, the air lines entirely disappearing and the long lines of the metals only persisting. With a very long exposure (fifteen times normal), the band spectrum of nitrogen was faintly perceptible in the spectrum of the self-induction spark. In the case of metals containing impurities, the spectrum of the impurity is well shown in the modified spark spectrum. Photographs of the metallic spectra mentioned accompany the paper, showing clearly the contrast between the two types of spark. The apparatus consisted of a 10-inch spark coil, three Leyden jars, each of 1200 sq. cm. surface, with self-induction varying from 0.00012 to 0.0038 henry in secondary circuit. The photographed spectra extended from λ 5900 to λ 3400.

THE Annual Progress Report of the Geological Survey of Western Australia for 1898, reached us at the close of 1899. Field-work has been carried on mainly by Mr. A. Gibb Maitland and Mr. Torrington Blatchford in areas which were considered to be of economic importance. Among these the crystalline rocks of the southern and western portions of the colony received attention. The schists and gneisses have a general strike to N.E. and S.W., but it was not found possible to draw any lines separating granite from gneiss or other schistose rocks. A belt of iron-bearing schist, about six miles in width, has been traced to the north of Northam. The country consists chiefly of granite, in which are belts of vertical mica- and hornblende-schists, and banded iron-bearing quartzites. In places these quartzites have proved to be auriferous.

THE anthropological aspect of primitive mathematics has recently been approached in two such very different ways by Herr L. Frobenius ("Die Mathematik der Oceanier"; *Naturwissenschaftliche Wochenschrift*, Bd. xiv. 1899, p. 573), and W. J. McGee ("The Beginning of Mathematics"; *American Anthropologist*, N.S. vol. i. 1899, p. 646) as in itself to constitute an interesting psychological study. The German investigator gives lists of numerals from numerous localities, and classifies them into structural groups, which fall naturally into geographical districts; for example, the group which has practically only two numerals lies to the south of Indonesia (*i.e.* part of New Guinea and Australia); that with five is found in the middle district (portions of New Guinea), while that with ten numerals is characteristic of the northern district, whence it has spread into Micronesia, Melanesia, and Polynesia. The various exceptions and variations are noted, as well as the way in which the numerals illustrate primitive addition, multiplication and subtraction. The American student starts with the axioms that (1) Primitive men are mystics; (2) Primitive men are egoists. The Australian binary concept of things is expressed not only by their numeration, but even more clearly by their social and fiducial systems. The most widespread of the mystical numbers is four, the devotee of the Cult of the Quarters is unable to think or speak without habitual reference to the cardinal points. To most of the devotees of the quatern concept—forming probably the majority of the middle, primitive tribes of the earth—the mystical number four is sacred, perfect, all-potent, of a perfection and potency far exceeding that

of six to the Pythagoreans and the hexagram to Paracelsus. A somewhat higher stage is marked by the use of six as a mystical or sacred number; in this stage the cardinal points are augmented by the addition of zenith and nadir. In the case of last two cults the exoterically perfect numbers of four and six are esoterically perfected through the unity of subjective personality; hence the mystical numbers of five and seven. The author denies that the quinary system was primeval. The method of treatment by Prof. McGee is sufficiently illustrated by these quotations.

AN account, with illustrations, of the most interesting of the medals awarded to students in London Hospitals, is contributed to the current number of the *British Medical Journal* by Mr. T. E. James.

THE twenty-seventh annual dinner of the old students of the Royal School of Mines will be held on Friday, January 26, at the Hotel Cecil. The chair will be taken by Mr. H. G. Graves, who, for the past eight years, has acted as hon. sec. of the dinner committee.

THE current number of the *Electrician* contains, as a supplement, a large sheet-table giving details concerning the Electricity Supply Works in the United Kingdom. An immense amount of information concerning the plant in stations in operation or in progress is given in the table.

THE fish hatching experiments recently started by the Crystal Palace School of Fish Culture have now been resumed, and the operations may be witnessed daily at the Palace. The first lot of ova salmonidæ was laid on Friday last.

MESSRS. WHITTAKER AND CO. have published the fourth edition of Mr. T. H. Blakesley's "Papers on Alternating Currents of Electricity for the use of Students and Engineers." A prominent characteristic of the book is that various electrical problems are dealt with by geometrical methods.

A COPY of the seventh volume of *Natur und Haus*—an illustrated magazine for naturalists, using the word in its widest sense—has been received. Numerous excellent illustrations are distributed through the pages, and the articles will interest all students of natural history having even an elementary knowledge of the German language. The publisher is Gustav Schmidt, Berlin.

THE second of the Selborne winter lectures will be delivered at the Linnean Society's Room at Burlington House, W., on Tuesday, January 16, at 8.30 p.m. The subject will be "Man's First Contact with Nature," by Prof. G. S. Boulger. The February lecture will, it is hoped, be the one promised some months ago by the Hon. J. Scott Montagu, M.P., on "South African Fauna and Flora"; and the March lecture by Dr. Lubbock.

THE thirteenth edition of "Discoveries and Inventions of the Nineteenth Century," by Mr. Robert Routledge, has been published by Messrs. G. Routledge and Sons. In matters which have been brought prominently before the public, such, for instance, as Röntgen photography and wireless telegraphy, the book is up-to-date, but in some of the less familiar sections it is many years behind the times. The section on the spectroscope particularly needs to be revised. Used with discrimination, the book contains much instructive information concerning achievements of modern science and industry.

HORTICULTURAL science and practice are fortunate in having such a trustworthy exponent as *The Garden*, of which the first number of a new series has just been published. The journal was founded in 1871 by Mr. William Robinson, and during its existence has done much to promote improved methods in

horticulture and extend the knowledge of beautiful flowers, shrubs and trees, and of the best ways of dealing with them. Botanists, horticulturists, and all lovers of plants should see the number which commences the new series. Among the articles we notice one on the Royal Gardens, Kew, illustrated, as are the other contributions, with several instructive half-tone pictures.

ASTRONOMY figures prominently in the January number of *Knowledge*. Mr. A. Fowler contributes an article on the constituents of the sun, in which he summarises the researches and conclusions of modern solar physics. Mr. E. W. Maunder commences a series of articles on astronomy without a telescope, and the Rev. J. M. Bacon describes the balloon ascent made by him with the object of observing the Leonid meteors. Among other subjects of articles are plants and their food, by Mr. H. H. W. Pearson, and the natives of Australia and their origin, by Mr. R. Lydekker, F.R.S.

OUR contemporary, *Science Gossip*, is doing good work in publishing a series of papers, by competent naturalists, dealing with different groups of the British invertebrate fauna, in the form of popular monographs. Portions of three memoirs of this series appear in the January number—namely, one, by Mr. Sopp, on dor-beetles; a second, by Mr. Soar, on freshwater mites; and a third, on spiders, by Mr. F. P. Smith. By the quotation from *Antony and Cleopatra*, the author first named seems to have proved beyond cavil that the Shakespearian term *shards* refers to the elytra of the dor-beetle. While thus keeping in the main to the British fauna, the editor has admitted one descriptive paper dealing with a wider area—to wit, a contribution, by Dr. H. C. Lang, describing the Palearctic butterflies, of which the present section is devoted to the numerous species of the beautiful genus *Parnassius*.

THE *Jahrbuch* of the *Zeitschrift für physikalische Chemie* contains an interesting memoir by Dr. T. Estreicher upon the solubility of argon and helium in water. The value given by Prof. Ramsay in his preliminary note in 1895 for the solubility coefficient of helium (·0073 at 18°·2) would make helium the least soluble of gases, a conclusion borne out by its exceedingly low critical point: but from the experiments of Dr. Estreicher it would now appear that the true value of the coefficient is about double this preliminary value. The apparatus used was identical in principle with that of Ostwald, but was improved in two important points: the use of a glass spiral connecting the measuring and absorption vessels, enabling the apparatus to be made wholly of glass, and the immersion of the whole apparatus in water. This water jacket rendered accurate determinations of the solubility coefficients possible at temperatures between 0° and 50° C. The results are plotted in the form of curves, nitrogen being also shown on the same scale for the sake of comparison. The solubility curve of argon is of the usual type, decreasing with rise of temperature from ·0578 at 0° to ·02567 at 50°. The solubility of helium varies very slightly with temperature, the curve exhibiting a minimum at about 25° C., the values being ·015 at 0°, ·01371 at 25°, ·01404 at 50°. The nitrogen and helium curves intersect at 30°, where their solubilities are the same; above this temperature nitrogen has a smaller solubility than helium. The author points out that although the occurrence of a minimum of solubility is peculiar, it is not unique, since Bohr and Bock found a minimum of solubility for hydrogen at about 60°.

THE additions to the Zoological Society's Gardens during the past week include a Diana Monkey (*Cercopithecus diana*) from West Africa, presented by Mr. S. W. Thompson; a Common Tern (*Sterna fluviatilis*), European, presented by Mr. J. Newton; a Tawny Owl (*Syrnium aluco*), British, presented by

Madam de Bunsen; Moor Macaque (*Macacus maurus*) from the East Indies, a Crested Porcupine (*Hystrix cristata*) from West Africa, two Crossbills (*Loxia curvirostra*), European; three Serrated Terrapins (*Chrysemys scripta*), a Prickly Trionyx (*Trionyx spinifer*), a Bull Frog (*Rana catesbeiana*) from North America, deposited; two White-eyebrowed Wood-Swallows (*Artamus leucorhynchus*), two Masked Wood-Swallows (*Artamus personata*) from Australia, purchased.

OUR ASTRONOMICAL COLUMN.

CENTRAL STAR OF RING NEBULA IN LYRA.—M. W. Stratonoff, of the Tashkent Observatory, has been engaged in measuring the brightness of the central star of the annular nebula in Lyra, and has communicated his results to the *Astronomische Nachrichten*, Bd. 151, No. 3607. A considerable number of photographs of the nebula have been obtained with the large telescope of 0·83m. aperture, extending over the period September 8, 1895, to September 15, 1899, the exposures varying from 30 to 90 minutes. From his measures of the brightness of the central star as compared with the magnitudes of 30 neighbouring comparison stars, M. Stratonoff shows that the magnitude varies from 13·1 to 9·5. A special series of photographs taken with extra long exposures, however, renders the question of variability, as measured from photographic impressions, somewhat doubtful. On a plate exposed for anything between 22m. and 1h. 23m. the mean magnitude of the star was 11·6. On a plate exposed for 10 hours, the magnitude was 10·1; while on exposing for 20 hours, the measured magnitude was 3·6. The author suggests, as explanation of this, that the star may really be simply a condensation of part of the whole nebulous matter, and the effect of long exposure will be to lessen the contrast between the condensed centre and the outlying fainter matter.

THE INDIAN UNIVERSITY OF RESEARCH.

A Conference was held at Simla at the end of October last to consider the Tata scheme for a Research University for India. A full report of the Conference is in the *Madras Educational Review*, from which the following particulars have been derived:—

The gentlemen invited by the Government of India to meet in conference with Mr. J. N. Tata regarding the proposed University were as follows:—The Hon. Mr. T. Raleigh, presiding, Mr. Jamsetji N. Tata (with his Secretary, Mr. Padshah), the Hon. Mr. Justice Ranade, Surgeon-General Harvey, the Hon. Dr. Duncan, Director of Public Instruction, Madras, Prof. Pedler, F.R.S., Director of Public Instruction, Bengal, Mr. Sime, Director of Public Instruction, Punjab, Principal MacMillan, Bombay, Mr. A. H. L. Fraser, Officiating Home Secretary.

The Conference first discussed fully the manner in which the scheme should be launched, so as to keep in view the ultimate ideal and at the same time make progress as funds permit. The Conference were of opinion that it is an essential feature of the scheme to have a central institution for research, as well as a central authority to control the operations conducted under the scheme. And they were of opinion that there is ample room, and indeed a clear necessity, for such a central institution.

At the same time they realised the necessity for taking advantage of existing facilities for research, whether in the shape of special local facilities (as of trade, products, &c.), or in the shape of good laboratories or museums, and men qualified for scientific research. They acknowledged that even in the unfavourable circumstances hitherto existing, students had shown in certain instances distinguished aptitude and capacity for research; and they believed that much good would be done by the grant of studentships, and also, where necessary, by assistance to the teaching and supervising staff. While, therefore, recognising that a central institution is necessary, and that there are certain departments of research (such as Technical Chemistry), which must even from the very first be provided for at that central institution, they recommended that at the outset every effort should be made to utilise existing facilities